



# Operation Manual

Condenser A 21

40018258

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## 1 Introduction

This chapter contains the information about the work with the operation manual.

### 1.1 About the Operation Manual

The operation manual is a part of the machine and is to be kept at the machine. The instructions from the third-party suppliers are also to be kept at the machine.

The operation manual can be identified through the material number and the editorial version. The identification properties are specified in the legal notice.

### 1.2 Availability of the Operation Manual

The machine owner must make sure that the personnel read and understand the operation manual correctly. The machine owner must make sure that the personnel that are involved in all machine works have easy and fast access to the operation manual always.

### 1.3 Used Conventions

The writing conventions that are used in this manual are as follows:

| Writing Convention  |                       |                                                                                           |
|---------------------|-----------------------|-------------------------------------------------------------------------------------------|
| Name                | Example               | Description                                                                               |
| Section information | Chapter 1, 1.1, 1.1.1 | The chapter numbers are given in a sequence. The chapter number starts with the number 1. |
| Figure number       | <i>Figure 1</i>       | The figure numbers are given in a sequence. The figure number starts with the number 1.   |
| Callout             | <b>1</b>              | The elements in the figure are identified with position numbers.                          |

### 1.4 Intended User

Only Rieter approved personnel are permitted to operate the machine, to do the maintenance work, and the repair work at the machine. The personnel must know the content of this operation manual and how to find the related information.

### 1.5 Liability

If against to regulations, the assembly of new or actual facility is done by a third party, Maschinenfabrik Rieter AG (called Rieter) declines all liability.

The auxiliary agents supplied by Rieter such as crane, caster jack etc. is to be used only in the area and for the types of machine intended and for no other purpose. Rieter declines all responsibility for any damage due to inappropriate usage of the auxiliary agents.

If the machine is used for any purpose other than for which it is intended, Rieter declines all liability.

## 2 Safety

This chapter contains the information about:

- The general safety information
- The intended users
- The location of the safety labels
- The safety equipment
- The danger zones

### 2.1 General Safety Information

This chapter contains information about the machine safety.

All personnel that do work at the machine must know and obey the safety instructions.

This machine has a state-of-the-art technology and supplies a high standard of operational reliability.

The standards and directives applied during design, production, and configuration are recorded in the EC / EU Declaration of Conformity and the manufacturer's declaration.

Also, the national safety regulations, the mill safety regulations, and the accident prevention regulations that are applicable must be obeyed.

#### Non-Observance of Safety Instructions

Rieter is not liable for damage that is caused by the non-observance of the safety instructions, in particular for damage that is caused because of:

- The machine is used for different purpose than the machine is made for.
- Incorrect operation
- Incorrect selection of materials and tools
- Not sufficient or missing maintenance work and repair work

### 2.2 Safety Messages

The safety messages contain a signal word, a safety symbol, and the safety instructions.



#### **DANGER**

**If the safety instructions are NOT obeyed, the situation causes death or irreversible injuries.**

**WARNING**

If the safety instructions are **NOT** obeyed, the situation can cause death or injuries.

**CAUTION**

If the safety instructions are **NOT** obeyed, the situation can cause small injuries.

**NOTICE**

This signal word shows that the user must obey the given procedure or message to prevent a property damage.

**Structure of the Safety Messages**

Each safety message contains the elements that follow:

- Safety symbol
- Signal word
- Type and source of the danger
- Consequences of the danger if not prevented
- Instructions to prevent the danger

**2.3 General Safety Instructions**

The basic safety instructions that follow must be obeyed:

1. Give the machine key and the password only to the approved personnel.
2. Only approved personnel are permitted to operate the machine.
3. Operate the machine only in a damage-free condition.
4. Stop the machine to change, to install, to remove, to do maintenance work, or to repair the machine or machine components. Set the main switch to the position OFF. Padlock the main switch.
5. Keep the machine floor, the platforms, and the ladders cleaned from grease, oil, and other fluids.
6. Do not climb on the machine.
7. Always wear personal protective equipment.
8. Bind the long hair.
9. Do not wear:
  - Finger rings
  - Wristwatches

- Scarves
- Loose cloths

### **Safety Devices and Monitoring Devices**

Only approved personnel are permitted to remove the safety devices and the monitoring devices. Before the devices are replaced, the approved personnel must make sure that the main switch is set to the position OFF, the main switch is padlocked, and the power supply is disconnected. Modifications that are not approved can cause death, injury, or property damage.

The instructions that follow are to be obeyed:

1. Do not make the safety devices short-circuit.
2. Make only approved modifications.
3. Do not assemble the machine again without an approval.
4. Examine the correct function of the safety devices before the machine starts to operate.

### **External Transportation System**

The safety requirements for an external transportation system are to be obeyed by the operating company.

The operating company must make sure that the warning signs, the mandatory signs, and the prohibition signs are possible to be read.

## **2.4 Emergency Report**

The accident is reported as follows:

- Who calls?
- What occurred?
- Type of injury?
- When?
- Where?
- How many persons have an injury?
- Do other dangers occur?

If an accident occurs:

1. Do the first-aid treatment.
2. Call the local emergency center.

## **2.5 Personal Protective Equipment**

The personal protective equipment that follows is to be used:

| Symbol                                                                              | Information                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <b>Safety helmet</b><br>Use a safety helmet to prevent head injuries. Refer to the standard EN 397:2012+A1:2012.                                                                                                                                                                                                                                                                                                               |
|    | <b>Eye protection</b><br>Use an eye protection to prevent the eyes from particles that occur during the work at the machine. Refer to the standard EN ISO 166.                                                                                                                                                                                                                                                                 |
|    | <b>Ear protection</b><br>Use an ear protection to prevent the ears from high-volume noise. Refer to the standard EN 352.                                                                                                                                                                                                                                                                                                       |
|    | <b>Respiratory protection</b><br>Use a respiratory protection to prevent the respiratory tract from dust. Refer to the standard EN 149:2001+A1:2009.                                                                                                                                                                                                                                                                           |
|   | <b>Safety gloves</b><br>Use cut-resistant safety gloves that have a flexible, impact-resistant layer to prevent the hands from cut injuries. Refer to the standard EN 388:2003.<br><br>Use chemical-resistant safety gloves to prevent the hands from injuries by chemical materials. Refer to the standard EN 374.<br><br>Use heat-resistant safety gloves to prevent the hands from burns. Refer to the standard EN ISO 407. |
|  | <b>Safety shoes</b><br>Use safety shoes to prevent the feet from injuries and the personnel from electric shocks. Refer to the standard EN ISO 20345 (category S3).                                                                                                                                                                                                                                                            |

## 2.6 Preventing Damage of Electronic Components

Electronic components are sensitive to electrostatic charging.

1. Discharge on grounded metal parts before you get in contact with electrical components. Use a grounding wristband.
2. Touch electronic components only if necessary.



Figure 1: No touch of electronic components

3. Do not touch the pins or parts of the printed circuit board of electronic components.

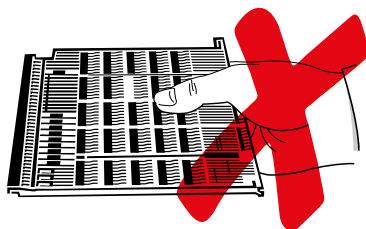


Figure 2: No touch of pins or tracks of electronic components

4. Prevent that electronic components touch chargeable objects (for example, synthetic materials).



Figure 3: Electronic components and chargeable objects

5. Do not keep electronic components around computer screens. Keep a distance of a minimum of 10 cm between the electronic component and the computer screen.



Figure 4: Electronic components around computer screens

## 2.7 Fire Protection

Fire can occur during the processing of textile materials.

The fire starts because of different causes as for example:

- Smoking
- Contact of the cotton with hot bearings
- Sparks that occur during the grinding of metals or because of a short circuit

The personnel must know how to operate the manually operated extinguishing systems for fire-fighting purposes.

The instruction of the personnel about the extinguishing systems and about the escape procedures is necessary.

The standards of the local fire protection authorities are to be obeyed to operate the fire extinguishing systems.

To prevent trash particles, dust, and fibers from explosion:

- An air circulation system must be installed especially in the areas of fiber operation.
- The pipe system that moves the fibers must be grounded.
- Dust and fibers must be removed regularly.
- A vacuum cleaner is to be used.

## 2.8 Safety Circuit and Safe Torque Off (STO)

The safety circuit has sensors, operating elements, and actuators.

The safety circuit is used for the protection of the personnel, the environment, and the equipment.

The electrical documentation contains information about the safety circuit connections.

The parts of the safety circuit are as follows:

- Emergency stop buttons
- Safety limit switches at the doors and the hoods
- Safety relays
- Frequency converters and control systems of stepper motors with integrated functional safety properties

### Functional Safety Properties of Frequency Converters and Control Systems of Stepper Motors

| Abbreviation of the Safety Property | Designation of the Safety Property |
|-------------------------------------|------------------------------------|
| STO                                 | Safe Torque Off                    |
| SOS                                 | Safe Operating Stop                |
| SBC                                 | Safe Brake Control                 |
| SS1                                 | Safe Stop 1                        |

| Abbreviation of the Safety Property | Designation of the Safety Property |
|-------------------------------------|------------------------------------|
| SS2                                 | Safe Stop 2                        |
| SSM                                 | Safe Speed Monitor                 |
| SLS                                 | Safe Limited Speed                 |
| SDI                                 | Safe Direction                     |

### Safe Torque Off (STO) (EN 60204-1)

The STO function makes sure that the torque-generating energy has no effect on the motor. The STO prevents an automatic start-up of the motor. The controller of the motor monitors the operating state.

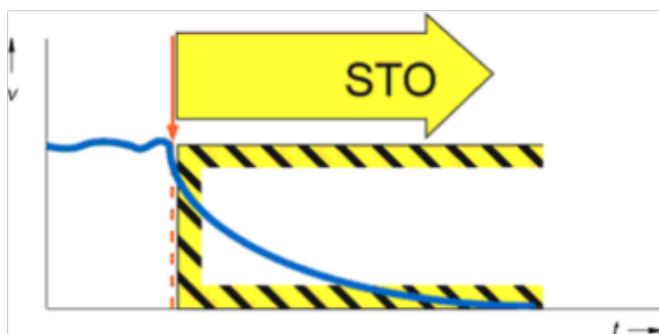


Figure 5: Safe torque off

### Safety Instructions for the Maintenance Work

1. Do not open the components in the safety circuit. Do not change the safety circuit.
2. Replace the defective safety components with total work units only.
3. Only the manufacturer or an organization (Rieter Repair Station) that has a written approval repair the safety devices.
4. Obey the necessary steps in the chapter "Maintenance" in the operation manual.

### After the Replacement of a Safety Component

1. Do the function test of the safety circuit. *Inspection Tasks* ▶ 49
2. Record the replacement and the function in the protocol of the safety circuit in the electrical documentation. *Protocol for the Safety Circuit* ▶ 47

### Exclusion of Liability

The standards in the operation manual are to be obeyed. Opened or changed safety devices can cause injuries to the personnel or damage at the machine.

If the changes that are not approved are done at the safety devices, the warranty by Rieter is not applicable.

The customer has full responsibility for the costs that are caused by the changes that are not approved at the safety devices.

## 2.9 Product Safety

This chapter contains the information about the product safety.

### 2.9.1 Safety Symbols at the Machine

Safety symbols of the machine-specified safety are put on machine parts or at the locations where possible risks exist.

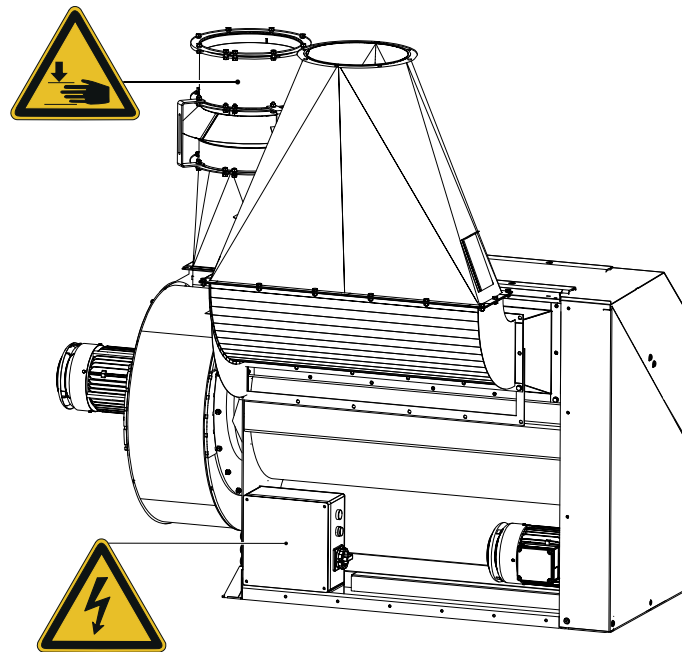


Figure 6: Safety symbol on the machine

These safety symbols are put on the surface of the machine because the operators see the safety symbols easily there.

| Symbol                                                                              | Description         | Location                  |
|-------------------------------------------------------------------------------------|---------------------|---------------------------|
|  | Electric shock!     | On the electrical box     |
|  | Risk of hand injury | On the open transfer pipe |

### 2.9.2 Window and Hood

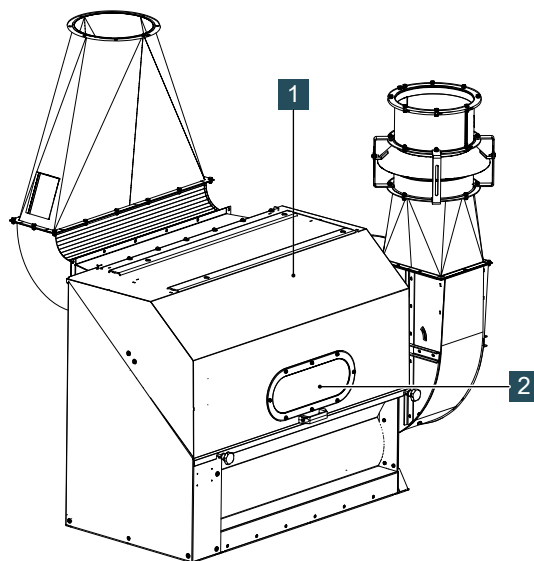


Figure 7: Window and hood

- |                                          |                                          |
|------------------------------------------|------------------------------------------|
| <b>1</b> Hood secured with safety switch | <b>2</b> Window secured with safety nuts |
|------------------------------------------|------------------------------------------|

### 2.9.3 Danger Zone at the Machine

This chapter contains the information about the danger zones at the machine. The machine has 2 types of danger zone, including the mechanical danger zone and the electrical danger zone.

## 2.9.3.1 Mechanical Danger Zone

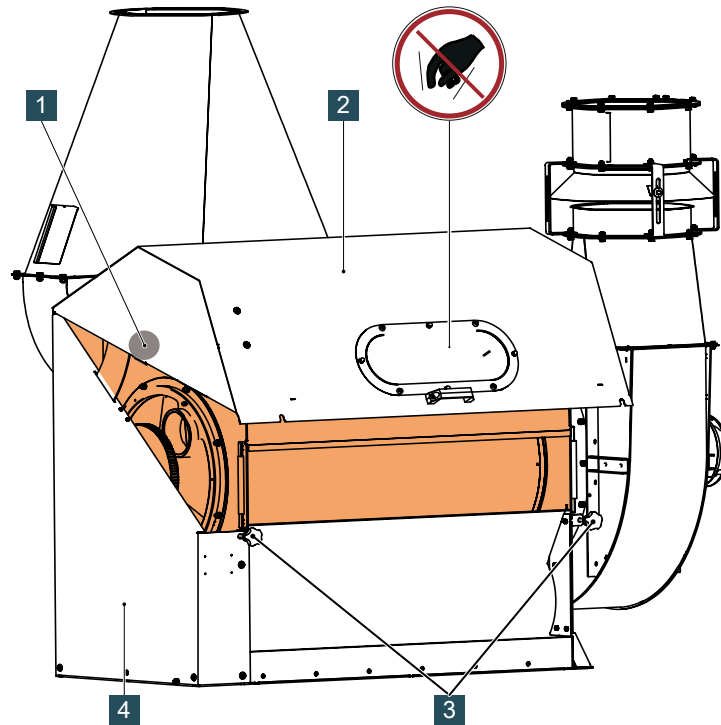


Figure 8: Mechanical danger zone

The mechanical danger zone of the machine includes the turning sieve drum below the hood **2**, which is monitored by a safety limit switch **1**, and the drive system behind the side door **4**.

With function of the safety limit switch **1**, when the operator opens the hood **2**, the machine stops immediately. Before opening the hood **2**, the operator must loosen the 2 screws **3** first.

The operator is not permitted to remove the safety nuts and open the Plexiglas window to clean the turning sieve drum during machine operation. In case the damaged Plexiglas window must be replaced, it must be made sure that the 2 safety nuts are affixed again.

### 2.9.3.2 Electrical Danger Zone

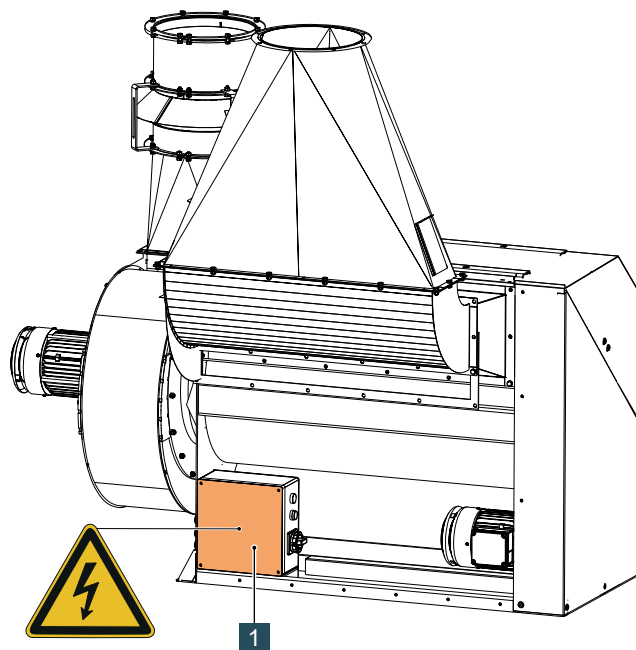


Figure 9: Danger zone at the control cabinet

The control cabinet contains the live components. A risk of injury is possible to occur because of an electric shock if the operator touches the live components. Only approved personnel are permitted to open the control cabinet door **1**.

### 2.9.4 Safety Devices at the Machine

The machine has safety devices that follow:

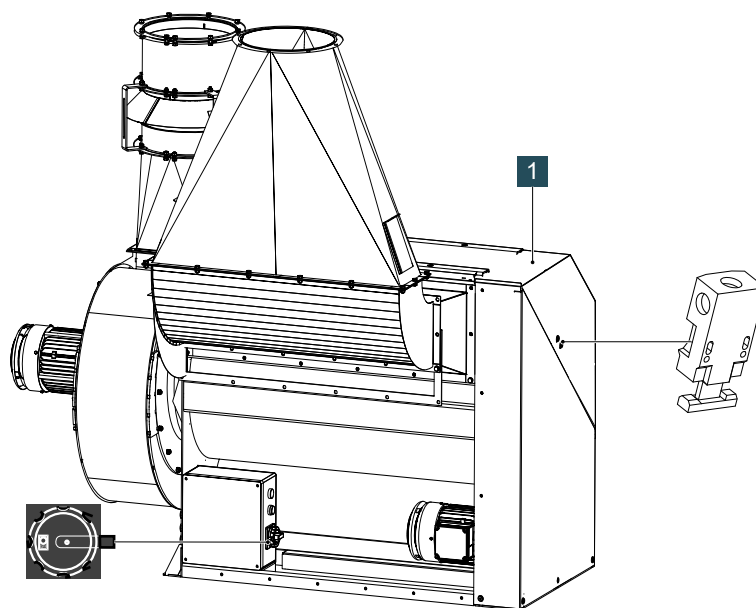
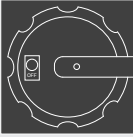
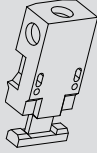


Figure 10: Safety device at the machine

| Switch                                                                            | Description                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Main switch</p> <p>The main switch has 2 positions: OFF and ON.</p> <p>The main switch is not an emergency stop button.</p> <p>Set the main switch to the OFF position and padlock the main switch before these procedures:</p> <ul style="list-style-type: none"> <li>– Maintenance work</li> <li>– Changeover work</li> <li>– Repair work.</li> </ul> |
|  | <p>Safety limit switch</p> <p>The drive behind the hood <b>1</b> is stopped immediately when the hood <b>1</b>, which is monitored through the safety limit switch, is opened. With this function, the possible risk of injuries caused by the operating toothed belt, pulley, and sieve drum is prevented.</p>                                            |

## 3 Product Information

This chapter contains the information about:

- The intended use of the machine
- The location of the identification plate
- The primary machine assemblies
- The basic machine functions
- The technical data
- The EC / EU Declaration of Conformity

### 3.1 Intended Use

The Condenser A 21 does the function of moving the tufts from the storage and feeding machines to the carding machine with the airflow. The sieve drum removes the dust and air from the tufts.

The personnel that operate the machine must obey the instructions in this operation manual. All operations other than given in this operation manual are **not** permitted.

### 3.2 Raw Materials

The machine only uses the textile raw materials that follow:

|                      |                                |
|----------------------|--------------------------------|
| Cotton               | From all sources               |
| Man-made fiber       | Natural and synthetic polymers |
| Maximum fiber length | 65 mm                          |
| Maximum cut length   | 60 mm                          |

### 3.3 Function Description

The chapters that follow contain the information about the function of the machine and the primary components.

#### 3.3.1 Machine Overview

This section gives information on the primary components of the machine.

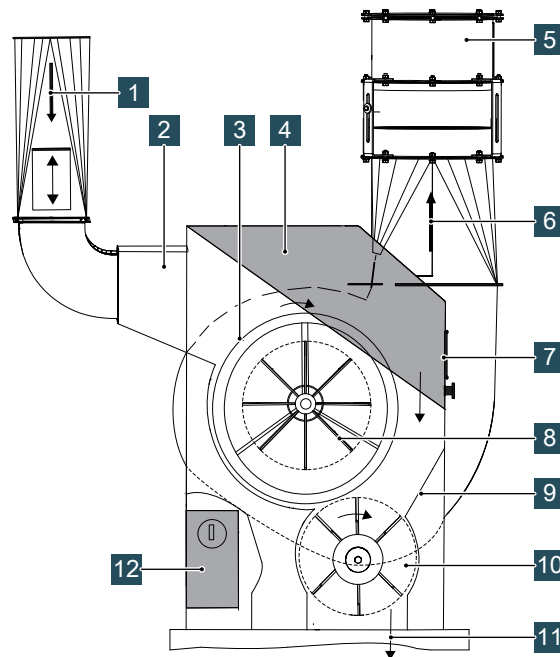


Figure 11: Primary components

|    |                                                                           |    |                    |
|----|---------------------------------------------------------------------------|----|--------------------|
| 1  | Feed funnel                                                               | 2  | Transition duct    |
| 3  | Sieve drum                                                                | 4  | Secured hood       |
| 5  | Open transfer (Used only when no VARIOline ECorized system is installed.) | 6  | Exhaust air outlet |
| 7  | View window                                                               | 8  | Fan                |
| 9  | Guide plate above take-off roller                                         | 10 | Take-off roller    |
| 11 | Material delivery                                                         | 12 | Electrical box     |

### 3.3.2 Machine Function

This section gives information on the material movement in the machine.

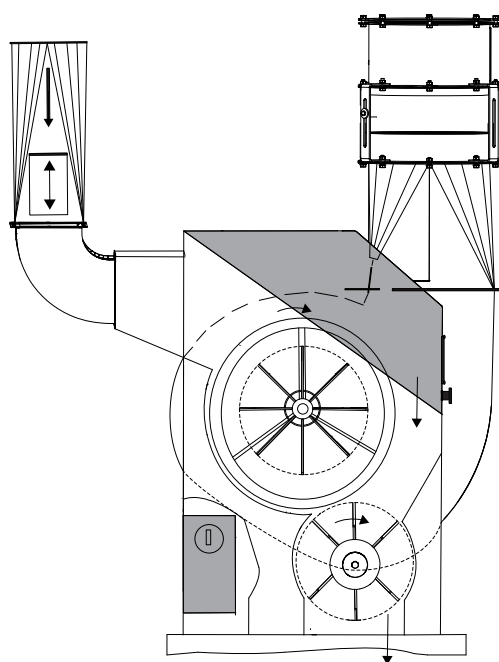


Figure 12: Machine function

## Operating Principles

The suction box transports cotton and synthetic fibers in tufts in a stream of air.

The tufts are free of dust.

The fan supplies the airflow.

The airflow transports the material.

The tufts are disconnected from the transport flow by the sieve drum, and removed therefrom by the take-off roller.

The exhaust air is sent to the filter system.

## 3.4 Technical Data

The information about the technical data is for a standard machine.

### 3.4.1 Dimensions

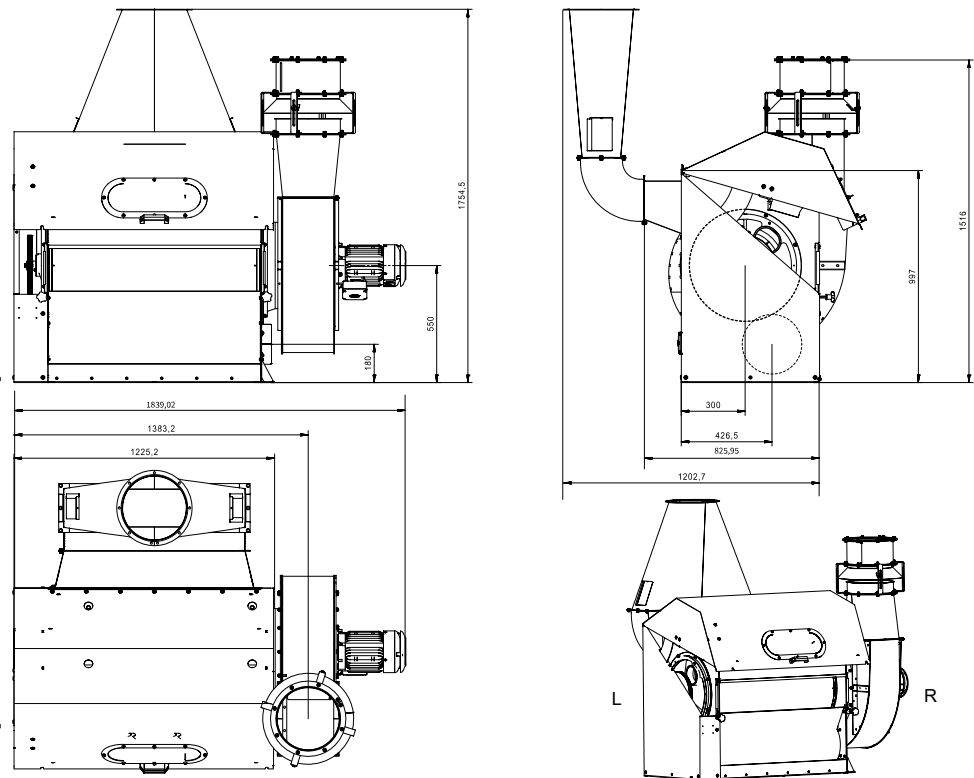


Figure 13: Dimensions

### 3.4.2 Weights

| Designation      | Weights |
|------------------|---------|
| Machine with fan | 400 kg  |
| Fan              | 65 kg   |

### 3.4.3 Electrical Data

#### Mains Connection

If the mains voltage is not within the specified range, a transformer must be used to ensure stable conditions.

3 x 400 V (+/- 10 %)

#### Installed Electric Power

Machine specific power ratings and fuses

See electro diagram

### 3.4.4 Performance Characteristics

#### Processing of Textile Raw Materials

|                           |                                                                             |
|---------------------------|-----------------------------------------------------------------------------|
| Textile raw materials     | The machine is intended solely for the processing of textile raw materials. |
| Non-textile raw materials | Non-textile raw materials must not be processed in the suction box.         |

#### Raw Materials

|                 |             |
|-----------------|-------------|
| Cotton          | All sources |
| Man-made fibers | Max. 65 mm  |
| Recycling       | Max. 65 mm  |
| Comber wastes   | All         |

#### Volumetric Air Flow Rates

|                                  |           |
|----------------------------------|-----------|
| Flow rate of exhaust air         | 4300 m³/h |
| Vacuum at the exhaust air outlet | 0 – 50 Pa |

#### Production

|                 |           |
|-----------------|-----------|
| Cotton          | 1000 kg/h |
| Man-made fibers | 900 kg/h  |

### 3.5 Identification Plate

The identification plate is found on the left side of the machine. For a spare part order, these information is given in the order form.

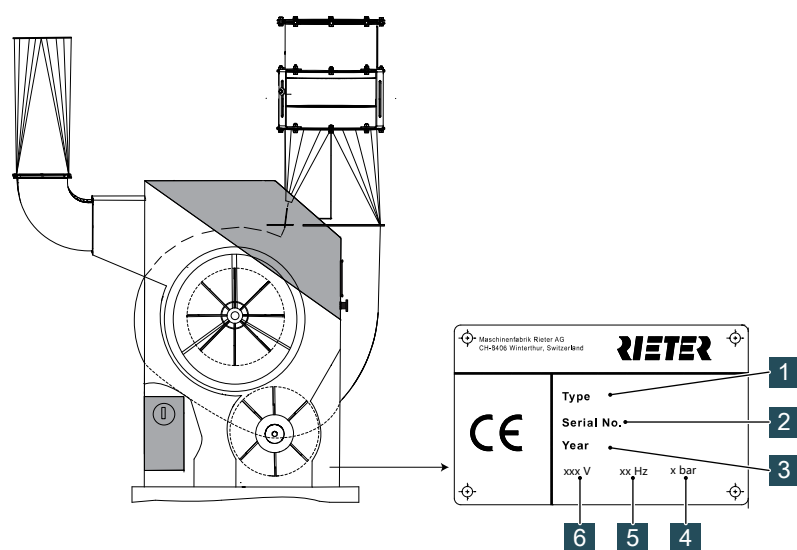


Figure 14: Identification plate

|          |                     |          |                |
|----------|---------------------|----------|----------------|
| <b>1</b> | Machine type        | <b>2</b> | Serial number  |
| <b>3</b> | Year of manufacture | <b>4</b> | Compressed air |
| <b>5</b> | Supply frequency    | <b>6</b> | Supply voltage |

## 3.6 EC/EU Declaration of Conformity



### EC / EU DECLARATION OF CONFORMITY

Maschinenfabrik Rieter AG  
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www.rieter.com

Winterthur, 22 February 2018

Maschinenfabrik Rieter AG declares that the product

#### Condenser A21

Serial Number: 40018258-xxxx

fulfills the following relevant provisions:

|            |                                                                                                                                                                                                     |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2006/42/EG | Machinery Directive<br>Reference - Directive 2006/42/EG, EU-Journal Nr. L 157/24 of June 9, 2006                                                                                                    |
| 2011/65/EU | Directive for the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)<br>Reference - Directive 2011/65/EU, EU-Journal Nr. L 174/88 of July 1, 2011 |
| 2014/30/EU | EU – Directive elektromagnetic compatibility<br>Reference - Directive 2014/30/EU, EU-Journal Nr. L 96/79, March 29, 2014                                                                            |

including their modifications

Used harmonized standards (including modifications):

|                         |                                                                                               |
|-------------------------|-----------------------------------------------------------------------------------------------|
| EN ISO 11111-1:2016     | Textile machinery - Safety requirements<br>Part 1: Common requirements                        |
| EN ISO 11111-2:2016     | Textile machinery - Safety requirements<br>Part 2: Spinning preparatory and spinning machines |
| EN 60204-1:2006+A1:2009 | Safety of machinery – Electrical equipment of machines<br>Part 1: General requirements        |

Person authorized to compile the technical file:  
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Maschinenfabrik Rieter AG

J. Binnig  
Head Product Unit Blowroom

P. Schelling  
Head Development Blowroom

Figure 15: EC certificate

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## 4 Packaging and Transportation

This chapter contains the information about:

- The general packaging instructions
- The packaging
- The packaging accessories
- The instructions on the safe machine transport

### 4.1 Packaging and Transportation Personnel

Only Rieter approved personnel are permitted to:

- Transport the machine
- Remove or install the packing material
- Remove the machine from the material boxes or the transportation pallets
- Install the machine in the material boxes or on the transportation pallets

### 4.2 Liability for Unloading and Transportation

The customer is generally liable for the transportation to the installation site and the temporary storage. The customer is generally liable to unload the machine components at the installation site.

The installation personnel does not transport machine components to the installation site or unload components at the installation site. In the case that guidance from the installation personnel is necessary, the installation personnel cannot be held responsible for any damage that may arise.

### 4.3 Unpacking

1. Open the material boxes. Remove the packing material.
2. Examine if the machine or parts of the machine got damage during the transport.
3. If machine damage occurred, the personnel must tell the customer to give a report to the insurance office.
4. Use the pack list to examine the contents of the material boxes for missing parts.
5. If the material boxes do not contain all parts, the personnel must tell the customer to give a report to Rieter.
6. Remove the transport locks from the material boxes and the transportation pallets.

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## 5 Installation

This chapter contains the information about:

- The necessary installation conditions
- The necessary installation personnel
- How to prepare the set-up location for the machine.
- The necessary installation material
- The installation of the machine

### 5.1 Floor Condition

#### Floor Structure

If the floor structure is not stable or not flat, the machine is possible to be damaged.

Only approved personnel can make a plan of the floor structure. The floor load of each machine foot is to be obeyed. The soft materials such as slag, sand, and asphalt are not to be used as an intermediate layer **2**. If the soft materials are used as the intermediate layer, the vibration that the machine causes makes the intermediate layers **2** move.

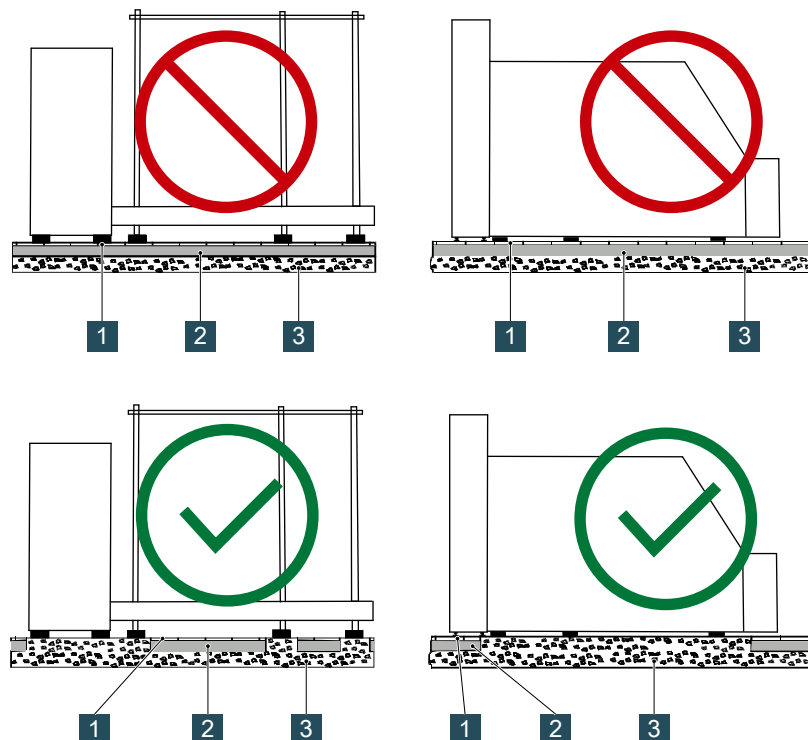


Figure 16: Floor condition

**1** Flooring

**2** Intermediate layer

### 3 Concrete substrate

The flooring **1** such as clinker, concrete slabs, or hard surfaces are not to be installed on the intermediate layers **2** that are made of slag, sand, and asphalt. To have a horizontal surface, minimum the area of the machine foot is to be filled with concrete substrate **3**.

Rieter accepts no liability for machine damage that is caused because the incorrect floor structure was used.

### Floor Properties

The floors must have the properties that follow:

- Not aggressive to metals
- High abrasion resistance
- High compressive strength
- Slip-resistant
- Hard and tough, non-ceramic
- Resistant to oils, fuel, acids, and alkalis

### Level and Evenness of the Floor

|                        |        |
|------------------------|--------|
| For each running meter | ±4 mm  |
| For each 4 m           | ±10 mm |

## 5.2 Installation Requirements for the Customer

The customer:

- Gives an introduction about the danger zones of the installation site
- Tells the installation personnel about the site-specific safety regulations
- Makes sure the site-specific safety
- Must install the necessary rails
- Makes sure that the training for the installation personnel is held before the installation
- Makes sure that the installation personnel of the customer is not changed during the installation
- Makes sure that the installation personnel have access to the operation manual

## 5.3 Installation Personnel

Only Rieter personnel or Rieter approved personnel are permitted to install the machine.

## 5.4 Installing the Machine

### 5.4.1 Installing the Delivery Funnel

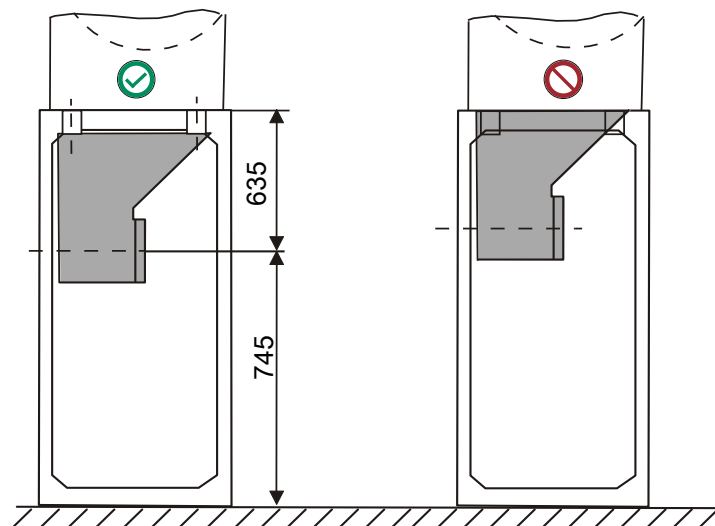


Figure 17: Delivery funnel installation

1. Install the delivery funnel from below onto the frame.

**Result** The delivery funnel is installed.

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## 6 Commissioning

This chapter contains the information about:

- The commissioning personnel
- The initial commissioning of the machine
- The recommissioning after a temporary decommissioning
- The function test

### 6.1 Commissioning Personnel

Only Rieter personnel or Rieter approved personnel are permitted to commission the machine.

### 6.2 Recommissioning after a Temporary Decommissioning

For the recommissioning of the machine the check list that follows is to be used:

- The machine is in a damage-free condition.
- The power supply is connected.
- The compressed-air supply is connected.
- The anti-corrosion agent is removed.
- All technology components are clean.
- Tension is applied to all timing belts, flat belts, or V-ribbed belts.
- The padlock is removed from the main switch.
- The direction of rotation of the motors is examined.
- Necessary operating fluids are filled.

### 6.3 Introduction to Commissioning

The commissioning work has 4 different situations as follows:

#### Initial Commissioning after Installation

Machines that are manufactured by Rieter are to be commissioned by Rieter personnel.

If the installation or initial commissioning is done by a third party, Rieter rejects all and any form of liabilities.

See *Commissioning without Material* ▶ 36

#### Commissioning after Assortment Change

After each assortment change, the adjustments are to be made accordingly.

See *Setting the Machine for Production* ► 41

### Commissioning after Maintenance and Repair Work

After the maintenance and repair work, the machine is to be commissioned.

See *Commissioning without Material* ► 36

### Recommissioning after Temporary Decommissioning

For recommissioning, the check list that follows is to be obeyed:

- Put the machine into safe status.
- Connect the power again.
- Remove the corrosion preventive.

See *Recommissioning after a Temporary Decommissioning* ► 35

## 6.4 Commissioning without Material

This section contains the information about commissioning without material for the parts that follow:

- Toothed belt
- Wiper
- Safety device

### 6.4.1 Tightening the Toothed Belts

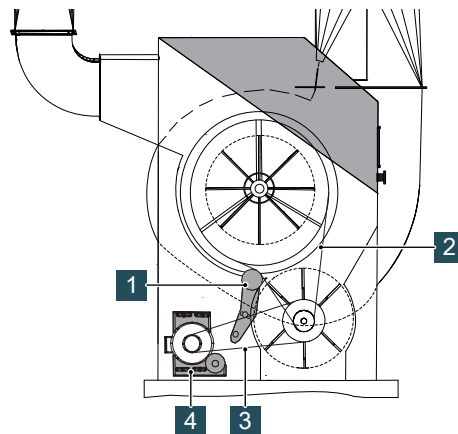


Figure 18: Toothed belts

1. Tighten the toothed belt **2** with the tension lever **1** to  $73 \pm 3$  Hz.
2. To tighten the toothed belt **3**, move the tensioning device **4**.
3. For the 50 Hz motor **4**, set the tension of the toothed belt **3** to  $80 \pm 3$  Hz.
4. For the 60 Hz motor **4**, set the tension of the toothed belt **3** to  $75 \pm 3$  Hz.

**Result** The toothed belts are tightened.

### 6.4.2 Adjusting the Wipers

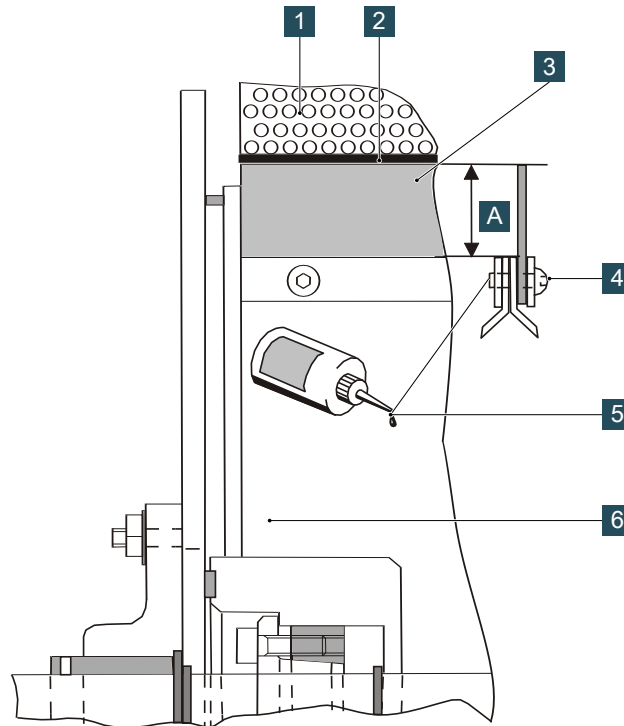
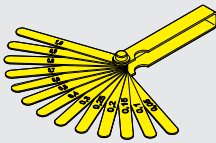


Figure 19: The wipers adjustment

**Prerequisites** Make sure that the criteria are obeyed:

- ✓ The main switch is set to the position OFF and the main switch is padlocked.
- ✓ Adhesive is to be used.
- ✓ A distance check gauge is to be used.

| Tool                                                                                | Tool Name      | Function Description                                                            |
|-------------------------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------|
|  | Distance gauge | The distance gauge is used to measure and adjust the clearances at the machine. |

1. Set the distance **A** between the wipers **3** and the sieve drum **1** to 22 – 23 mm with the distance check gauge.
2. To prevent the high-volume noise, do not set the wipers **3** forward.
3. To prevent the overlap of tufts around the take-off roller **6**, do not set the wipers **3** rearward.
4. Make sure that the wipers **3** don't touch the strip bar **2** of the sieve drum **1** and the guide plates.
5. Attach the bolts **4** with the adhesive **5**.

.....

**Result** The wipers are adjusted.

#### 6.4.3 Doing the Function Test of the Safety Device

1. Set the main switch to the position ON.
2. Start the machine for operation.
3. Do the function test of the safety limit switch. See *Doing the Function Test of the Safety Device* ► 51

**Result** The function test of the safety device is done.

## 7 Operation

This chapter contains the information about:

- The operating personnel
- The name and the location of the display elements and the operating elements
- The operating units
- How to adjust the machine without material and with material
- How to start the machine and the operation procedure
- The operation of the machine during the operation procedure
- How to stop the machine and the operation procedure

### 7.1 Operating Personnel

Only Rieter approved personnel are permitted to operate the machine.

### 7.2 Operating Elements

This chapter contains the information about the operating elements of the machine.

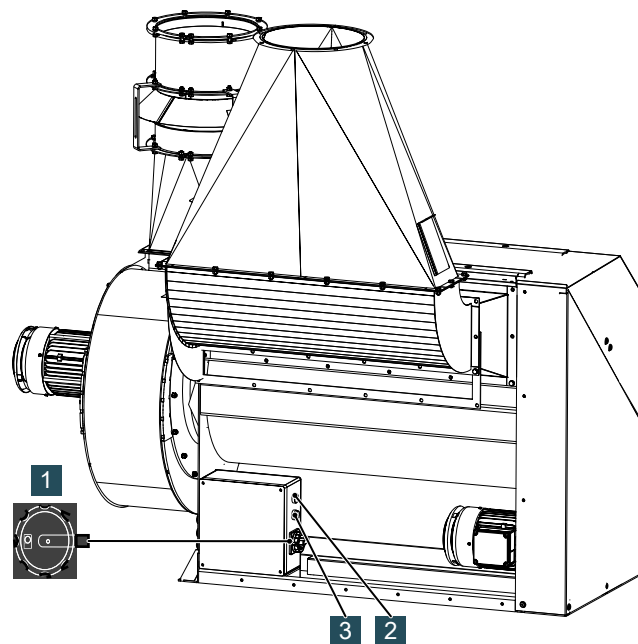


Figure 20: Operating elements of the machine

- |   |                     |   |                      |
|---|---------------------|---|----------------------|
| 1 | Main switch         | 2 | Machine start button |
| 3 | Machine stop button |   |                      |

### Main Switch

The main switch has position 0/OFF and position I/ON. The main switch is set to the position 0/OFF to disconnect the power supply from the machine or set to the position I/ON to connect the power supply to the machine.

### Machine Start Button and Stop Button

The suction box is usually started from the UNIconrol, while the machine start button and stop button can be used to start and stop the machine.

## 7.3 Gearing Layout

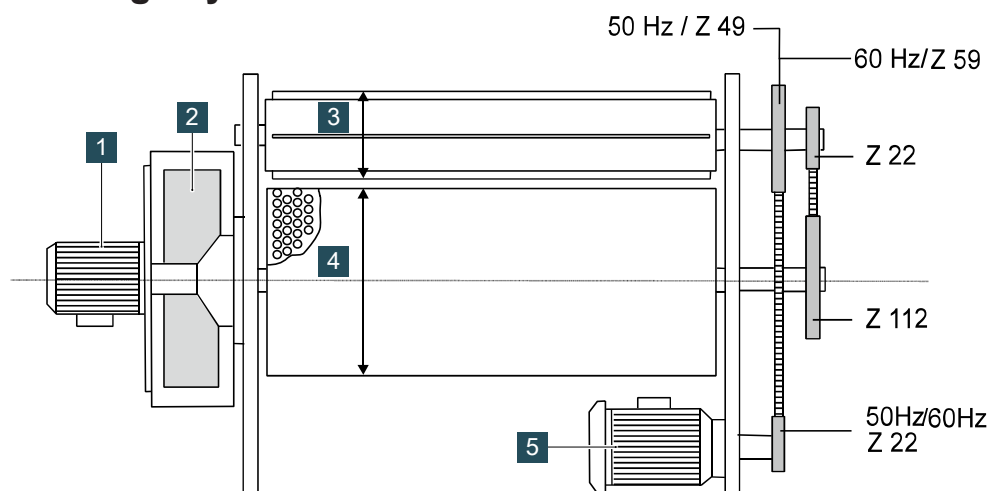


Figure 21: Suction box

|                                                                                         |                                                                              |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <b>1</b> Fan motor                                                                      | <b>2</b> (50 Hz) 528 mm fan wheel<br>(60 Hz) 450 mm fan wheel                |
| <b>3</b> Take-off roller diameter 300 mm<br>Take-off roller speed 420 min <sup>-1</sup> | <b>4</b> Sieve drum diameter 480 mm<br>Sieve drum speed 85 min <sup>-1</sup> |
| <b>5</b> Motor for take-off roller and sieve drum                                       |                                                                              |

## 7.4 UNlcontrol Operation

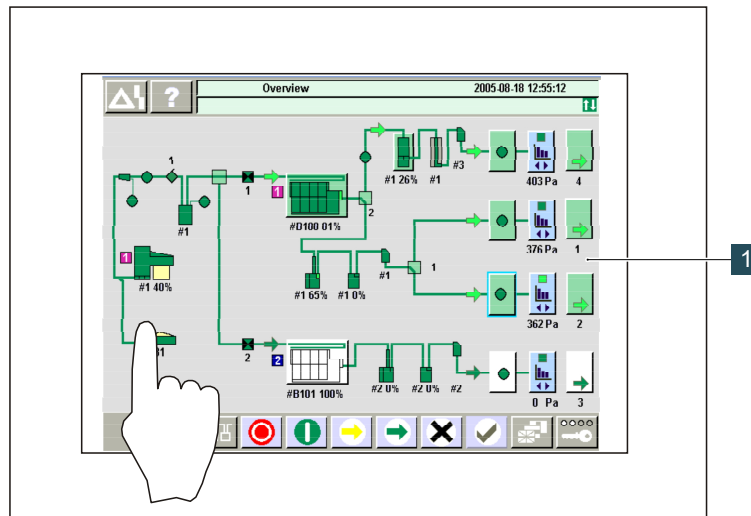


Figure 22: UNlcontrol operation

### Function Description

The blowroom machines are controlled centrally with UNlcontrol through the operating unit **1**.

Operation manual of the UNlcontrol system is to be observed for its operation.

## 7.5 Setting the Machine for Production

### 7.5.1 Adjusting the Air Conditions

The positions of the 2 secondary-air sliders affect the distribution of material at the sieve drum. The setting depends on the piping of the feed section.

The flow rate of the exhaust air is adjusted to the upstream machine and the length of the piping.

The air conditions are specified in the instructions for the upstream machine.

To prevent blockages, the material must be perfectly suctioned off at the upstream machine.

The higher the flow rate, the more the energy consumption and load on the filter system.

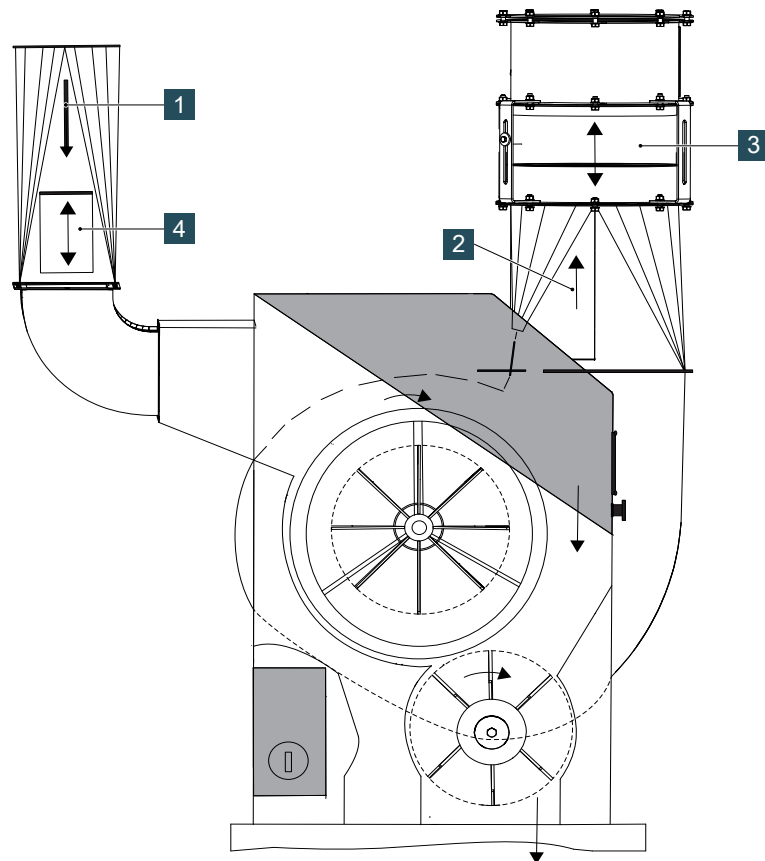


Figure 23: Airflow adjustment

1. To control the air speed for material movement **1**, adjust the position of the open transfer **3**.
2. Make sure that the filter system can accept the air being extracted **2**.
3. Set the exhaust air volume  $4300 \text{ m}^3 / \text{h}$ .
4. Set the vacuum of the exhaust air outlet at the range of  $0 - 50 \text{ Pa}$ .  
⇒ The open transfer **3** is adjusted.
5. To control the supply of material to the sieve drum, adjust the position of the secondary sliders **4**.
6. Set the air speed for material movement **1** at the range of  $10 - 12 \text{ m} / \text{s}$ .  
⇒ The secondary sliders **4** are adjusted.

**Result** The air conditions are adjusted.

### 7.5.2 Setting the Belt Operation

The driving belts of the sieve drum cylinder and of the take-off roller can be adjusted to run correct through the off-center bolt.

**Prerequisites** Make sure that the criteria are obeyed:

✓ The main switch is set to the position OFF and the main switch is padlocked.

1. Loosen the nut **2**.

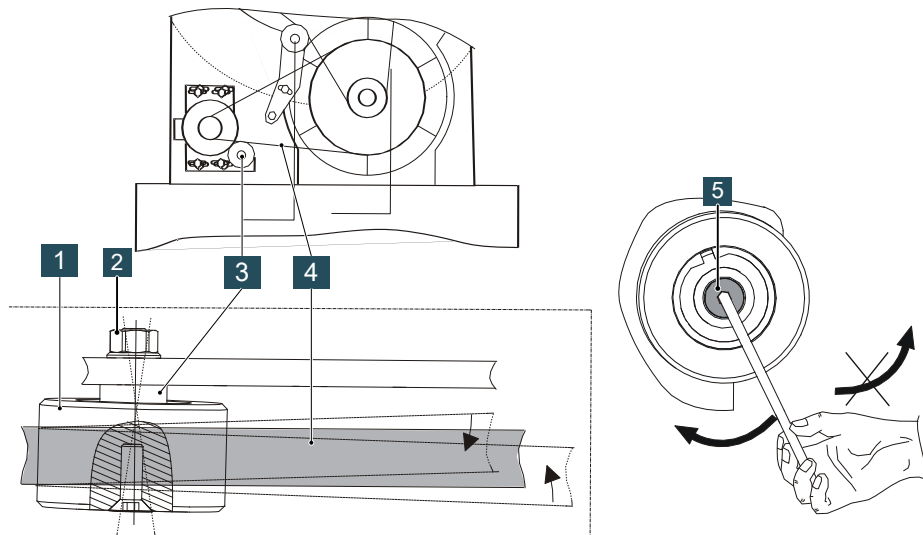


Figure 24: Belt operation

2. To turn the off-center bolt **3** a quarter, move the bolt **5** clockwise.
3. Make sure that the bolt **5**, which is secured with Loctite 243, is not turned counterclockwise.
  - ⇒ The changed position of the tensioning wheel **1** changes how the toothed belt **4** runs.
4. Tighten the nut **2**.
5. Start the machine.
6. See if the toothed belt **4** runs correct.
7. If necessary, adjust the off-center bolt **3** again.

**Result** The belt operation is set.

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## 8 Troubleshooting

This chapter contains the information about the fault cause and the remedy of:

- Faults that are marked with fault codes
- Faults that are not marked with fault codes
- Material specific faults

### 8.1 Troubleshooting Personnel

Only Rieter approved personnel are permitted to do the troubleshooting work at the machine.

### 8.2 Faults without Fault Code

If a fault occurs, the symbol of the related suction box on the user interface of the operating unit (UNIcontrol) is illuminated red.

At the same time, a message shows in the header of the user interface of the operating unit, while no faults are shown at the suction box.

The material flow is interrupted until the problem has been remedied.

| Cause          | Remedy                                |
|----------------|---------------------------------------|
| Motor overload | Examine all rollers for easy running. |

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## 9 Maintenance

This chapter contains the information about:

- The cleaning of the machine
- The lubrication of the machine
- The inspection of the machine

### 9.1 Maintenance Personnel

Only Rieter approved personnel are permitted to do the maintenance work at the machine.

### 9.2 Interval Specification

The intervals shown below are guide values.

| Interval Specification | Duration in 3-shift Operation |
|------------------------|-------------------------------|
| 165 operating hours    | 1 week                        |
| 330 operating hours    | 2 weeks                       |
| 660 operating hours    | 4 weeks                       |
| 2 000 operating hours  | 3 months                      |
| 4 000 operating hours  | 6 months                      |
| 8 000 operating hours  | 1 year                        |

### 9.3 Protocol for the Safety Circuit

In the protocol for the safety circuit, the replacement of each safety device is recorded.

The steps to replace the safety devices are as follows:

1. Identify each safety device in the electrical documentation of the machine.
2. Refer to the operation manual to replace each safety device. Replace fully the related safety devices.
3. To do the function test of each replaced safety device, refer to the operation manual of the machine.

Example of a protocol for the safety circuit:

| Date       | Device Tag | Location    | Replacement Description                                                                          | Who                | Signature |
|------------|------------|-------------|--------------------------------------------------------------------------------------------------|--------------------|-----------|
| 01/01/2015 | S8         | = SLO + EC1 | The emergency stop button is replaced because the red plastic push-button has mechanical damage. | J. Meyer           | JM        |
| 01/07/2016 |            |             | A function test of the safety circuit is done during the commissioning.                          | Mr. Field Engineer | FE        |
| --         | --         | --          | --                                                                                               | --                 | --        |
| --         | --         | --          | --                                                                                               | --                 | --        |
| --         | --         | --          | --                                                                                               | --                 | --        |
| --         | --         | --          | --                                                                                               | --                 | --        |

## 9.4 Cleaning Table by Cycle

| Target group          | Cleaning cycle      | Additional information |                      |
|-----------------------|---------------------|------------------------|----------------------|
| Maintenance Personnel | Cleaning each 660 h | 9.6.2                  | Cleaning the Machine |

## 9.5 Inspection Table by Cycle

| Target group | Inspection cycle         | Additional information |                                        |
|--------------|--------------------------|------------------------|----------------------------------------|
| Inspector    | Inspection each 8 000 h  | 9.7.1                  | Examining Tension of the Toothed Belts |
|              | Inspection each 16 000 h | 9.7.2                  | Examining the Felt Seals               |

## 9.6 Cleaning Tasks

This chapter contains the information how to clean the machine.

### 9.6.1 Cleaning Agents

| Stains                                                             | Cleaning Agents                                                     |
|--------------------------------------------------------------------|---------------------------------------------------------------------|
| Honeydew                                                           | Warm water                                                          |
| Residue from lubricants and deposits from synthetic fiber material | Cleaning alcohol or the water solution with grease-dissolving agent |

### 9.6.2 Cleaning the Machine

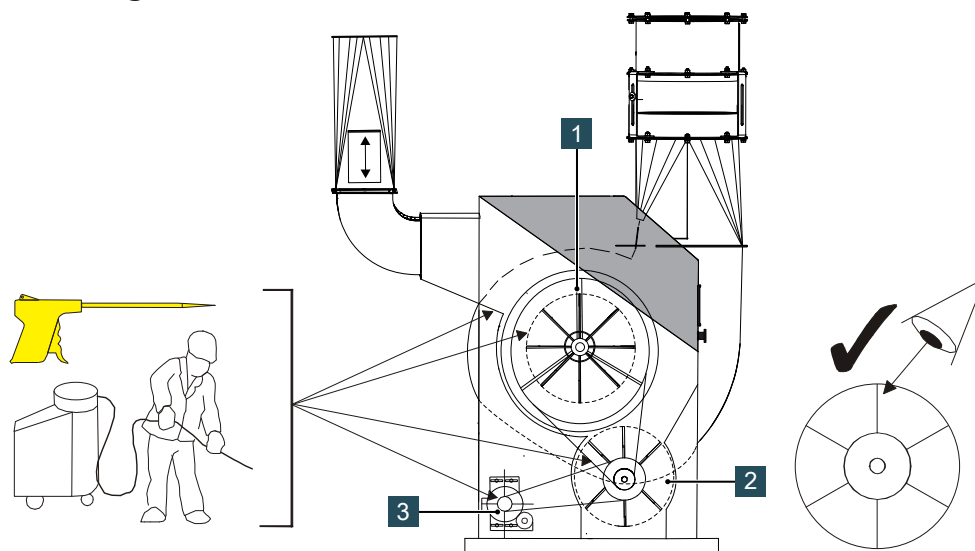
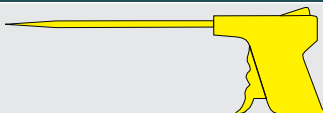


Figure 25: The machine cleaning work

**Prerequisites** Make sure that the criteria are obeyed:

- ✓ The main switch is set to the position OFF and the main switch is padlocked.
- ✓ An industrial vacuum cleaner is to be used.
- ✓ A roller picker is to be used.
- ✓ Cleaning agents are to be used.

| Tool                                                                                | Tool Name     | Function Description                                                                                              |
|-------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------------------------------------|
|  | Roller picker | The roller picker is used to pick up the materials that are collected around the rollers and other machine parts. |

1. Clean the machine surface with the industrial vacuum cleaner.
2. Clean the motor **3** with the industrial vacuum cleaner.
3. Clean the fast-turning sieve drum **1** with the roller picker.
4. Clean the take-off roller **2** with the roller picker.
5. Clean the machine surface with the cleaning agents.

**Result** The machine is cleaned.

### 9.7 Inspection Tasks

This chapter contains the information about the inspection tasks of the machine.

## 9.7.1 Examining Tension of the Toothed Belts

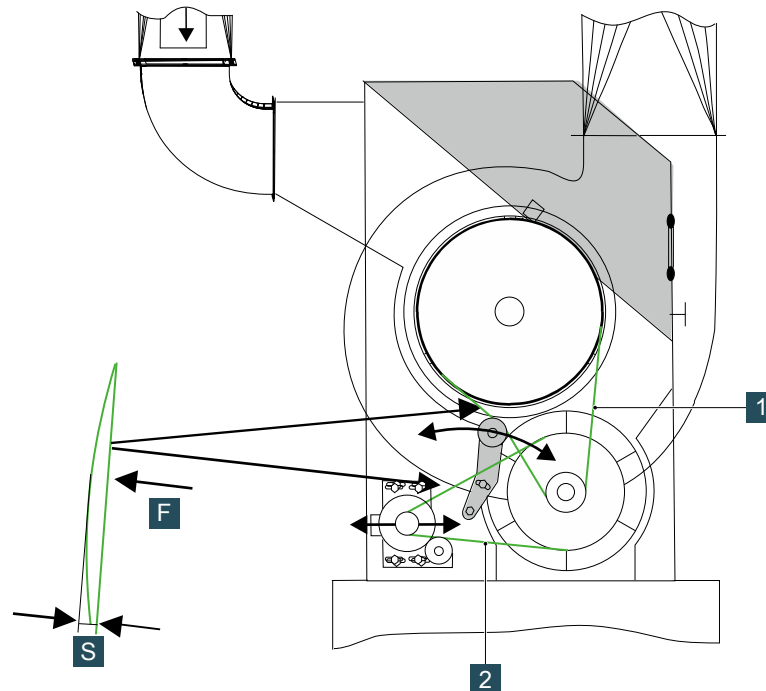


Figure 26: Tension of toothed belts

**Prerequisites** Make sure that the criteria are obeyed:

- ✓ The main switch is set to the position OFF and the main switch is padlocked.
- 1. Apply a load **F** of 7 kg at the center position of the toothed belt **1**.
- 2. If the movement **S** of the toothed belt **1** is not 11 mm, adjust the toothed belt **1**. See *Tightening the Toothed Belts* ▶ 36
- 3. Apply a load **F** of 7 kg at the center position of the toothed belt **2**.
- 4. If the movement **S** of the toothed belt **2** is not 11 mm, adjust the toothed belt **2**. See *Tightening the Toothed Belts* ▶ 36

**Result** The tension of the toothed belts is examined.

### 9.7.2 Examining the Felt Seals

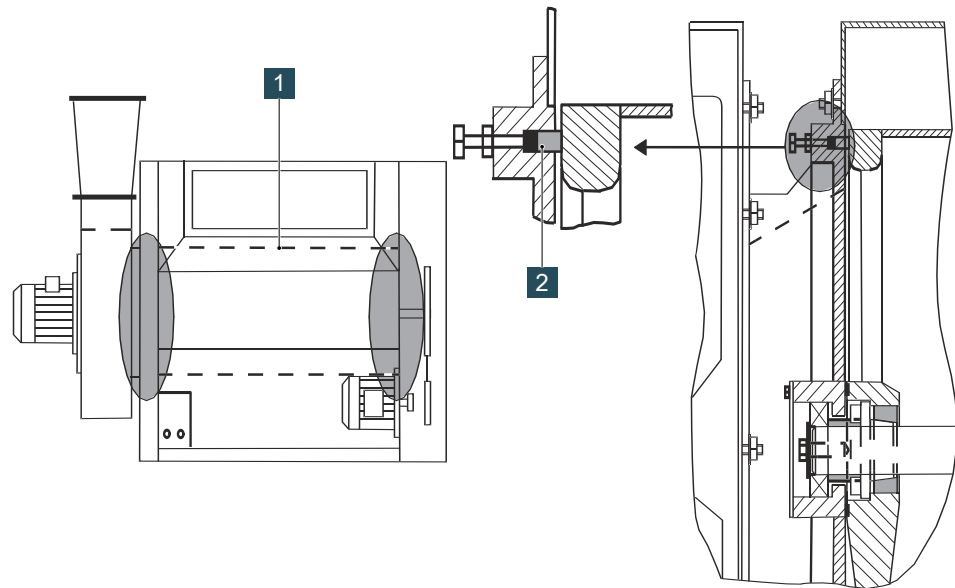


Figure 27: Felt seals

**Prerequisites** Make sure that the criteria are obeyed:

✓ The main switch is set to the position OFF and the main switch is padlocked.

1. Remove the hood and covers above the sieve drum **1**.
2. Remove the sieve drum **1**. See *Replacing the Sieve Drum* ▶ 59
3. Examine the condition of the felt seals **2**.
4. If the felt seals **2** are worn, replace the felt seals **2**.

**Result** The felt seals are examined.

### 9.7.3 Doing the Function Test of the Safety Device

Rieter recommends that a function test of the safety device is done after each manipulation, service, repair, and modification of the machine.

1. Set the main switch to the position ON.
2. Start the machine for operation.
3. Open the hood **2**, which is secured by the safety limit switch **1**.

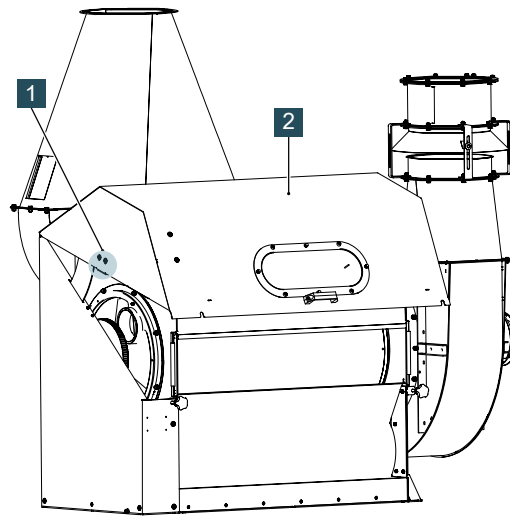


Figure 28: Hood

- ⇒ If the machine stops, the safety limit switch **1** works.
- ⇒ If the machine does not stop, the safety limit switch **1** does not work.

**Result** The function test of the safety device is done.

## 10 Repair

This chapter contains the information about the repair work of the machine.

### 10.1 Repair Personnel

Only Rieter approved personnel are permitted to do the repair work at the machine.

### 10.2 Safety Regulations

The information that follows is the safety regulations that have to be obeyed:

- The machine is at a standstill.
- The main switch is set to the position OFF and the main switch is padlocked.

**Risks** The risks of injury to the personnel occur during the repair work because of:

- Human error
- Not using the personal protective equipment
- Not sufficient visual contact and communication with the personnel in the danger zone
- Electrical short-circuit



#### **DANGER**

##### **The safety devices are removed or bypassed!**

Death or dangerous injuries

- ▶ Do NOT remove the installed safety devices.
- ▶ Do NOT bypass the installed safety devices.



#### **WARNING**

##### **Turning parts!**

Risk of hand injury.

- ▶ Stay away from the machine until the machine is at a standstill.

### 10.3 Repair Work

This chapter contains the information about how to repair the defective machine parts.

#### 10.3.1 Replacing the Toothed Belts

Rieter recommends replacing the toothed belt of the sieve drum cylinder and the toothed belt of the take-off roller at the same time.

## Removing the Toothed Belts

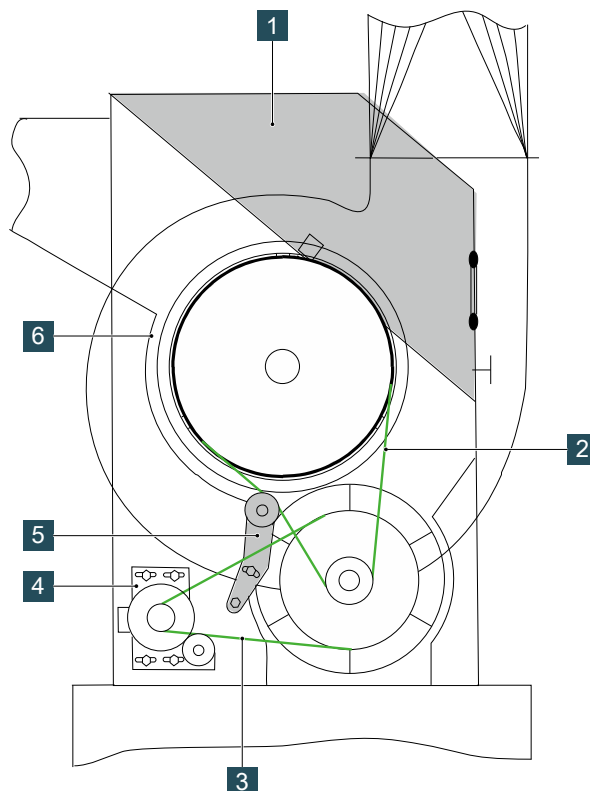


Figure 29: Toothed belts

**Prerequisites** Make sure that the criteria are obeyed:

✓ The main switch is set to the position OFF and the main switch is padlocked.

1. Open the hood **1**.
2. Remove the cover **6**.
3. Loosen the bolts from the bearing plate of the motor **4** to remove the toothed belt **3**.
4. Loosen the bolts from the tension lever **5** to remove the toothed belt **2**.

**Result** The toothed belts are removed.

## Installing the Toothed Belts

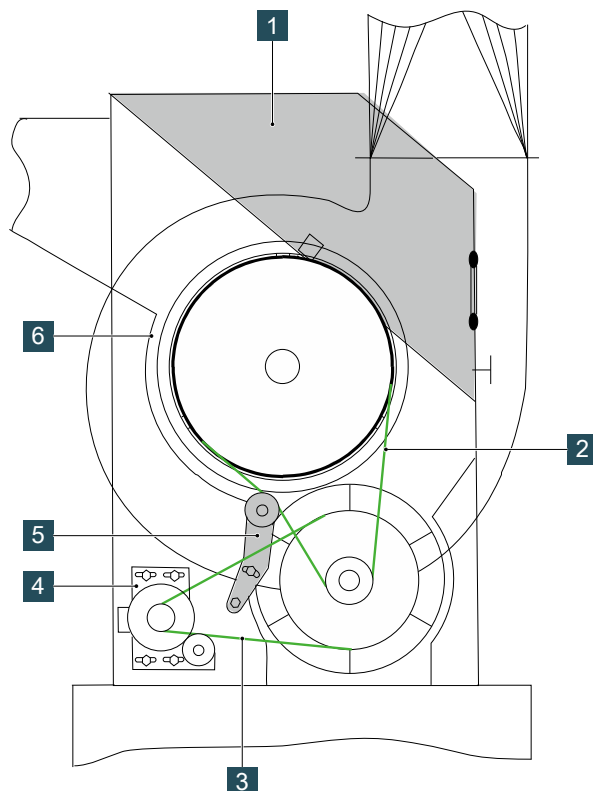


Figure 30: Toothed belts

**Prerequisites** Make sure that the criteria are obeyed:

✓ The main switch is set to the position OFF and the main switch is padlocked.

1. Attach the new toothed belt **2**.
2. Tighten the toothed belt **2** with the tension lever **5**. See *Tightening the Toothed Belts* ▶ 36
3. Attach the new toothed belt **3**.
4. Move the motor **4** to tighten the toothed belt **3**. See *Tightening the Toothed Belts* ▶ 36
5. Install the cover **6**.
6. Install the hood **1**.

⇒ The toothed belts are installed.

**Result** The toothed belts are replaced.

### 10.3.2 Replacing the Take-off Roller

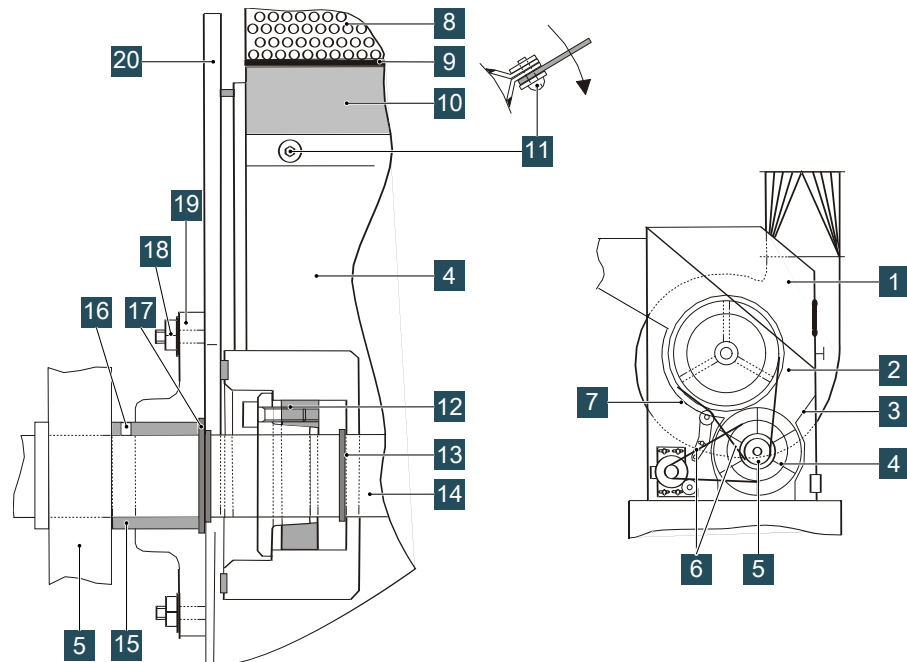


Figure 31: Take-off roller replacement

#### Removing the Take-off Roller

**Prerequisites** Make sure that the criteria are obeyed:

✓ The main switch is set to the position OFF and the main switch is padlocked.

1. Open the hood **1**.
2. Remove the cover **2**.
3. Remove the guide plate **3**.
4. Remove the belt pulley **5**.
5. Remove the toothed belts **7**.
6. Attach the take-off roller **4**.
  - ⇒ The take-off roller **4** doesn't fall down.
7. Loosen the thread pins **16**.
8. Remove the spacer bushing **15**.
9. Remove the nuts **18**.
10. Pull the flange bearing **19**.
11. Keep the washers **17** safe.
12. Loosen the clamping element **12** on the left and right sides of the take-off roller.
13. Remove the bolts **21**.

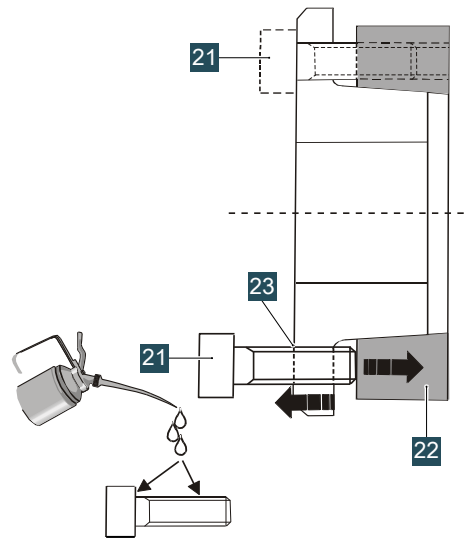


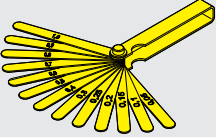
Figure 32: Clamping element removal

14. Put the bolts **21** into the holes **23**.
15. Tighten the inserted bolts **21** evenly and in a crosswise sequence.
  - ⇒ The conical connection **22** becomes loose.
16. Pull out the shaft **14** on the drive side.
  - ⇒ The take-off roller is removed.

## Installing the Take-off Roller

**Prerequisites** Make sure that the criteria are obeyed:

- ✓ The main switch is set to the position OFF and the main switch is padlocked.
- ✓ A distance gauge is to be used.

| Tool                                                                                | Tool Name      | Function Description                                                            |
|-------------------------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------|
|  | Distance gauge | The distance gauge is used to measure and adjust the clearances at the machine. |

1. Install the take-off roller **4** with the mounted wipers **10**. See *Adjusting the Wipers* ▶ 37
2. Align the bolt head **11** with the direction of turning.
3. Move the shaft **14** into the take-off roller **4**.
  - ⇒ The shaft **14** reaches the stop on the Seeger circlip ring **13**.

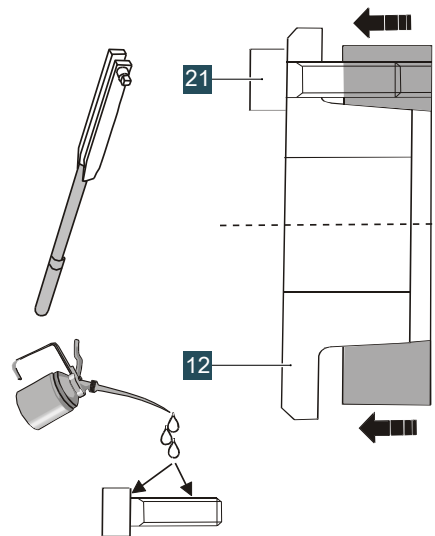


Figure 33: Clamping element installation

4. Clean and slightly lubricate the contact surfaces, hub, and bolts of the shaft **14**.
5. Do not apply any paste, grease or oil with EP additives.
6. Push in the clamping elements **12**.
  - ⇒ The clamping elements **12** reach edge of the hole for the take-off roller **4**.
7. Tighten the clamping elements **12** with a tightening torque of 41 Nm.
8. Install the washers **17**.
9. Install the flange bearing **19**.
10. Install the belt pulley **5**.
11. Install the take-off roller **4** on the drive side.
12. Align the thread pins **16** with the milled groove on the shaft **14**.

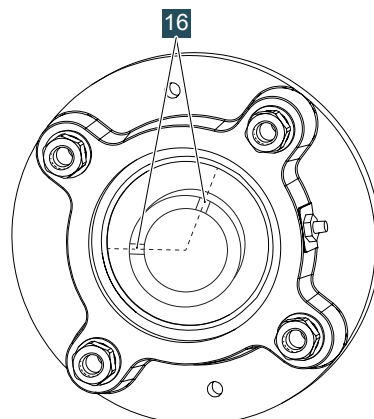


Figure 34: Thread pin alignment

13. Make sure that the thread pins **16** are not tightened.
14. Tighten the center screw **24**.

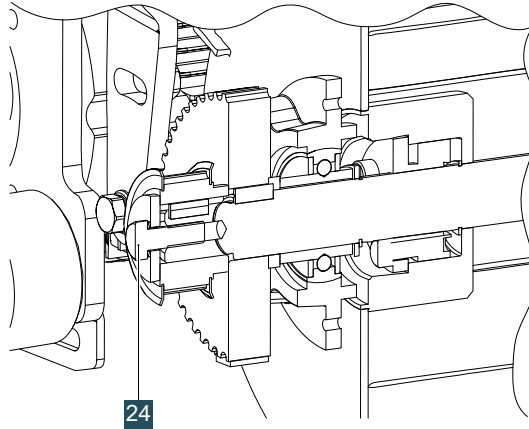


Figure 35: Center screw

15. Examine if the take-off roller **4** is in the center of the frame **20**.
  16. Measure the distances between the take-off roller **4** and the frame **20** with the distance gauge.
  17. If the distance is not same on the 2 sides, use washers **17** to correct the difference.
  18. Tighten the thread pins **16**.
  19. Secure the thread pins **16** with Loctite.
  20. Before the Loctite hardens, turn the thread pins **16** rearward for ¼ turn.
  21. Make sure that the wipers **10** do not touch the strip bar **9**, the sieve drum **8**, and the guide plates **3**, and **4**.
- ⇒ The take-off roller is installed.

**Result** The take-off roller is replaced.

### 10.3.3 Replacing the Sieve Drum

When replacing the sieve drum, the customer is recommended to replace the felt seals and the ball bearings at the same time.

## Removing the Sieve Drum

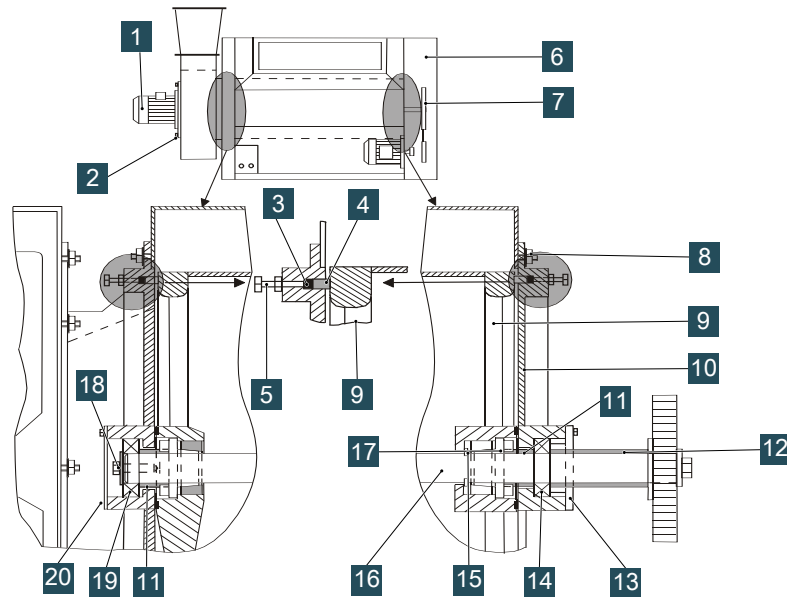


Figure 36: Sieve drum

### Prerequisites Make sure that the criteria are obeyed:

- ✓ The main switch is set to the position OFF and the main switch is padlocked.

1. Open the hood.
2. Remove the side cover **6**.
3. Remove the belt pulley **7**.
4. Remove the toothed belts. See *Replacing the Toothed Belts* ▶ 53
5. Remove the bolts **2**.
6. Remove the fan **1**.
7. Remove the bearing cover **20**.
8. Remove the bolts **18**.
9. Remove the bolts **8**.
10. Remove the gearbox flange **10**.
11. Remove the sieve drum **9** from the housing.
12. Remove the felt seals **4**.
13. Loosen the bolts **5**.
14. Remove the support ring **3**.
15. Clean the groove.
  - ⇒ The sieve drum is removed.

## Installing the Sieve Drum

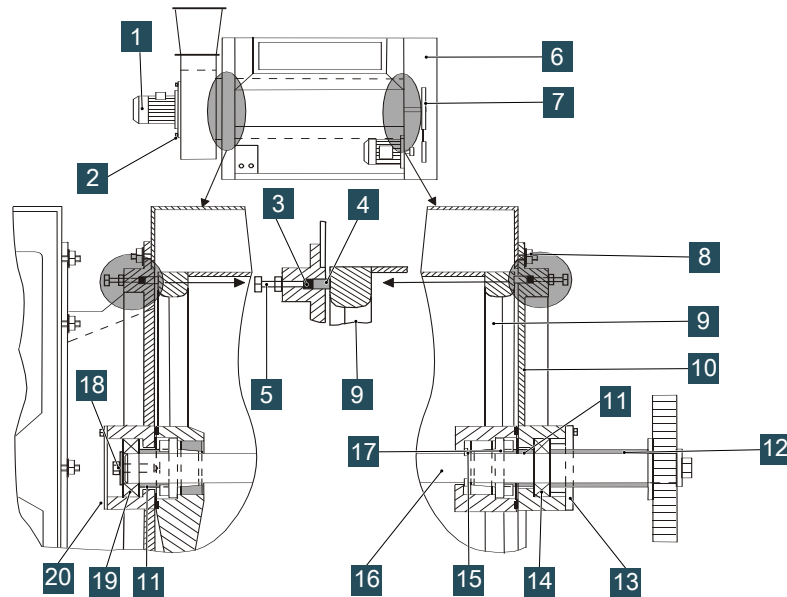


Figure 37: Sieve drum

### Prerequisites Make sure that the criteria are obeyed:

- ✓ The main switch is set to the position OFF and the main switch is padlocked.
- ✓ New felt seals have been installed.
- ✓ New ball bearings have been installed.

1. Install the support ring **3**.
2. Move the shaft **16** into the sieve drum **9**.
  - ⇒ The shaft **16** gets the stop on the Seeger circlip ring **15**.
3. Put the spacer bushings **11** and the clamping elements **17** on the shaft **16**.
4. Clean and slightly lubricate the contact surfaces of the shaft, hub, and bolts.
5. Make sure that paste, grease, or oil with EP additives are not applied.
6. Tighten the clamping elements **17** with a tightening torque of 41 Nm.
7. Install the sieve drum **9**.
8. Put the ball bearings **19** and the bolt **18** with the washer.
9. Tighten the bolts **18**.
10. Install the bearing cover **20**.
11. Install the gearbox flange **10** with the ball bearing fittings **14**.
12. Tighten the nuts **8**.
13. Put the bushing **12**.
14. Put the bearing cover **13**.
15. Attach the belt pulley **7**.

16. Tighten the bolts **5** with hands until the support ring **3** presses the felt seals **4** against the sieve drum **9**.
17. Use the lock nuts to secure the bolts **5**.
18. Make sure that the sieve drum **9** is possible to be turned by hand.
19. Make sure that the felt seals **4** are flush against the sieve drum **9**.
- ⇒ The sieve drum is installed.

**Result** The sieve drum is replaced.

## 11 Decommissioning and Storage

This chapter contains the information about:

- The personnel
- The temporary decommissioning of the machine
- The final decommissioning of the machine
- The storage of the machine

### 11.1 Decommissioning Personnel

Only Rieter approved personnel are permitted to do the decommissioning and storage of the machine.

### 11.2 Measures for the Decommissioning and Storage

#### Temporary Decommissioning

A temporary decommissioning is a decommissioning only for a short time because of a shutdown. The purpose is to set the machine back into operation after the end of the shutdown.

These temporary decommissioning works are to be done:

1. Remove the fiber material from the machine.
2. Remove all operation fluids from the machine. Obey the national regulations for the storage or the disposal of all operation fluids.
3. Set the main switch to the position OFF. Padlock the main switch.
4. Disconnect the compressed-air supply.
5. Decrease the machine temperature to the ambient temperature.
6. Remove the tension from the timing belts, the flat belts, or the V-ribbed belts.
7. Clean the machine and all technology components correctly. Prevent the machine and all technology components from corrosion and impurities.

#### Final Decommissioning

The purpose of a final decommissioning is to prepare the machine:

- For the storage for a longer period
- For the transport to a different location
- For the disposal

These conditions for the final decommissioning are to be completed:

1. Remove the fiber material from the machine.
2. Remove all operation fluids from the machine. Obey the national regulations for the storage or the disposal of all operation fluids.

3. Set the main switch to the position OFF. Padlock the main switch.
4. Disconnect the compressed-air supply.
5. Disconnect the power supply to the machine.
6. Decrease the machine temperature to the ambient temperature.
7. Remove the tension from the timing belts, the flat belts, or the V-ribbed belts.
8. If the machine is prepared for the storage, clean the machine and all technology components correctly. Prevent the machine and all technology components from corrosion and impurities.
9. Disassemble the machine into units that stay in a safe condition during the transport.
10. Use the initial transport locks and the initial package materials. Obey the transport regulations. *Packaging and Transportation* ► 29

## Storage

1. Keep the machine in a clean and dry room. Put the machine and machine parts on a flat surface. Identify the machine with an identification mark.
2. Prevent unauthorized personnel to go into the storage room.

## 12 Disposal of the Machine

This chapter contains the information about the disposal of the machine.

### 12.1 Disposal of the Machine

This chapter contains the information about the disposal of the machine after the end of the service life.

The machine owner has the responsibility for the correct disposal of the machine.

The instructions in the chapters that follow are to be obeyed:

- Safety
- Packaging and Transportation
- Decommissioning and Storage

The national regulations for the disposal of the machine and all operation fluids, batteries, and package materials are to be obeyed.

The disposal includes:

- Reusability
- Recycling
- Disposal of waste

The materials are to be divided in relation to the material group. The materials are to be given to the correct collection point:

- Steel
- Copper
- Brass
- Rubber
- Electronic waste
- Cast iron
- Glass
- Plastics
- Liquid materials
- Dangerous waste

The machine manufacturer Rieter is to be told about the disposal of the machine.

E-mail: [info@rieter.com](mailto:info@rieter.com)

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## 13 Appendix

This chapter contains the information about:

- Tightening torque standard
- Tools and gauges

### 13.1 Tightening Torque Standard

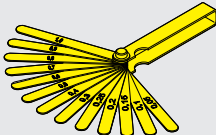
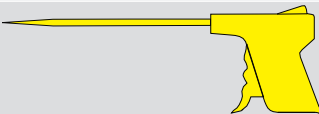
| Screw Dimension                         | Strength Class     | Tightening Torque [Nm] | Clamping Force [kN] |
|-----------------------------------------|--------------------|------------------------|---------------------|
| M4<br>Coefficient of friction 4G = 0.14 | 4.8 (welding stud) | 1.5                    | --                  |
|                                         | 8.8                | 3.1                    | 3.9                 |
|                                         | 10.9               | 4.5                    | 5.7                 |
|                                         | 12.9               | 5.3                    | 6.7                 |
| M5                                      | 4.8 (welding stud) | 3.0                    | --                  |
|                                         | 8.8                | 6.1                    | 6.4                 |
|                                         | 10.9               | 8.9                    | 9.3                 |
|                                         | 12.9               | 10.4                   | 10.9                |
| M6                                      | 4.8 (welding stud) | 5.0                    | --                  |
|                                         | 8.8                | 10.4                   | 9.0                 |
|                                         | 10.9               | 15.5                   | 13.2                |
|                                         | 12.9               | 18.0                   | 15.4                |
| M8                                      | 4.8 (welding stud) | 13.0                   | --                  |
|                                         | 8.8                | 25.0                   | 16.5                |
|                                         | 10.9               | 37.0                   | 24.2                |
|                                         | 12.9               | 43.0                   | 28.5                |
| M10                                     | 4.8 (welding stud) | 25.0                   | --                  |
|                                         | 8.8                | 51.0                   | 26.0                |
|                                         | 10.9               | 75.0                   | 38.5                |
|                                         | 12.9               | 87.0                   | 45.0                |
| M12                                     | 8.8                | 87.0                   | 38.5                |
|                                         | 10.9               | 130.0                  | 56.0                |
|                                         | 12.9               | 150.0                  | 66.0                |
| M16                                     | 8.8                | 215.0                  | 72.0                |
|                                         | 10.9               | 310.0                  | 106.0               |
|                                         | 12.9               | 370.0                  | 124.0               |
| M20                                     | 8.8                | 430.0                  | 117.0               |
|                                         | 10.9               | 620.0                  | 166.0               |

| Screw Dimension | Strength Class | Tightening Torque [Nm] | Clamping Force [kN] |
|-----------------|----------------|------------------------|---------------------|
| M24             | 12.9           | 720.0                  | 194.0               |
|                 | 8.8            | 740.0                  | 168.0               |
|                 | 10.9           | 1080.0                 | 239.0               |
|                 | 12.9           | 1240.0                 | 280.0               |

### 13.2 Tools and Gauges

This chapter contains the Rieter specific tools and gauges for:

- The transport of the machine
- The installation of the machine
- The maintenance of the machine
- The repair of the machine

| Tool                                                                                | Tool Name      | Function Description                                                                                              |
|-------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------|
|   | Distance gauge | The distance gauge is used to measure and adjust the clearances at the machine.                                   |
|  | Roller picker  | The roller picker is used to pick up the materials that are collected around the rollers and other machine parts. |

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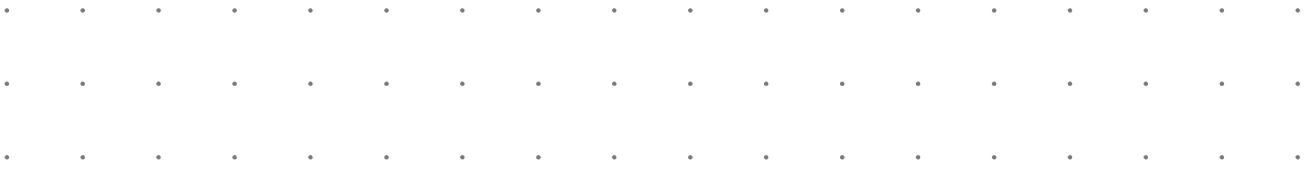
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**List of Tables**

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